METHOD AND APPARATUS FOR COMPACTING SAIL CARS

Cross Reference

The present invention claims the priority of U.S. Provisional Application No. 60/468,501, filed May 7, 2003.

Field of the Invention

The following is a provisional United States patent application.

The invention relates to method and apparatus for compacting or stacking sail cars above a boom when a very tall sail is lowered or furled. More specifically, most of the cars are compacted by diverting alternating cars onto a split track, to port or starboard, such that the height of the stacked cars is approximately halved.

Prior Art

Heretofore, when a sail of a sailboat has been stowed, furled or fully lowered, the sail or batten cars connecting the sail to the mast have been singly stacked along a centerline of the mast. This is not suitable when a sail is of great height, such as approximately 250 feet, is used since the singly stacked cars would reach approximately 20 feet above the boom, making storage of the dropped sail cumbersome at best.

Thus there exists a need for a method and apparatus for compacting the height of the cars which the present invention addresses.

Summary of the Invention

According to the invention, there is provided an apparatus for compacting sail cars comprising a track along which cars of the sail ride, the track comprising a vertical upper section and a lower section including a port and a starboard track; each car or track having guide structure thereon for, preferably but not necessarily alternately, guiding adjacent cars to opposite tracks of the lower section, effectively halving the vertical height of the stacked cars when the sail is stowed.

Further, according to the invention there is provided a method for compacting sail cars to effectively half a vertical height of the sail cars when stacked upon stowage of the sail, the method comprising the steps of:

creating a track for engaging the sail cars, the track having an upper vertical centerline section and a lower section including at least a port and starboard track;

creating the cars with guide structure thereon for, preferably alternately, guiding adjacent cars to opposite tracks of the lower section; and

stowing the sail by lowering same along the track until the cars are, preferably alternately, received within the port and starboard tracks, serving as stowage tracks.

It should be understood that a different arrangement than strictly alternately stacking cars could be used and yet fall within the scope of the invention.

Still further according to the invention there is provided an apparatus for compacting sail cars comprising a track along which cars of the sail ride, the track comprising a vertical upper section extending up the mast and a lower section including a port and a starboard track; the cars each having guide structure thereon for preferably alternately guiding adjacent cars to opposite tracks of the lower section, effectively halving the vertical height of the stacked cars when the sail is stowed. The track may also incorporate structure for maintaining one or more bottom cars adjacent the boom of the sail along a centerline of the mast rather than to either side thereof so as to provide sail symmetry.

Brief Description of the Drawings

Figure 1 is an elevational view of a sailboat having a very tall mast and sail with battens in the sail, with the battens mounted to batten cars sliding on a mast track.

Figure 2A is an end view of the prior art method and apparatus presently used for stacking of sail cars when the sail is lowered.

Figure 2B is an end view of the apparatus and method of the present invention for compact stacking of sail cars.

Figure 3 is an end view of an enlarged of the new apparatus and method for compact stacking of sail cars.

Figure 4 is an enlarged detail view of the area where the cars are switched onto one or the other of the lower port and starboard track sections.

Figure 5 is a cross sectional view through the upper track section taken along line 5-5 of Figure 4.

Figure 6 is a cross sectional view through the area where a bottom tip of the top track section is adjacent to a top tip of a bottom track section and is taken along line 6-6 of Figure 4.

Figure 7 is a top end view of the upper track section.

Figure 8 is a bottom end view of the lower track sections.

Figure 9 is an enlarged end view of the lower track sections and shows an optional guide placed to the outside side of each of the lower track sections against which edges of a car body bear with the guides keeping the car body from twisting and becoming lodged in the junction area before completely engaging on the lower track section.

Figure 10 is an end view of another embodiment of the apparatus and method of the present invention wherein a section of the upper track adjacent the lower track sections is capable of moving or pivoting from side to side to deliver adjacent cars to alternating bottom tracks.

Figure 11 shows the pivoting track section is a centerline or neutral position thereof.

Figure 12A is an enlarged elevational view showing one embodiment of a sail or batten car for engagement to the track.

Figure 12B is a bottom plan view of the sail car of Figure 12A.

Figure 12C is a side view of the sail car of Figure 12A.

Figure 13A shows a first accessory comprising a batten attachment fitting for receiving a batten and engaged to a rail car.

Figure 13B shows another accessory comprising a headboard for a sail engaged to a rail car.

Figure 13C shows a further accessory comprising a vertical bridge structure engaged to double rail cars.

Figure 14 is an end view showing two bottom cars adjacent the boom riding on their own vertical path by being engaged on the insides of and between the port and starboard tracks.

Figure 15 is an end view showing two bottom cars adjacent the boom riding on their own centerline track between the bottom track sections.

Figure 16 shows a horizontal bridge formed between the bottom two cars adjacent the boom which are on opposite bottom track sections, the bridge incorporating structure thereon for maintaining the sail in a centerline position between the bottom track sections.

Figure 17 is yet another alternative having a track with two lower portions, one of which is on the mast centerline, while the other is offset to one of port or starboard.

Figure 18 is a construction used in conjunction with the pivoting track structure of Figure 10 and shows cam means in the form of a wing on the track to permit the ascending cars to pivot the pivoting track carrying the wing to align the pivoting section to receive the ascending car.

Figure 19 is a schematic view of another embodiment showing a mast having three storage tracks below a pivoting track section which can pivot to send descending cars to any one of the three tracks.

Description of the Preferred Embodiments

Referring now to the drawings in greater detail there is illustrated therein a large sailboat 10 having a mast 12 which supports a battened main sail 14, having a plurality of battens 11.

The sail 14 is held or engaged to the mast 12 by a plurality of cars 16 which can be attached to the battens (batten cars 16A) or the sail (sail cars 16B) which ride up and down the mast 12 along a track 18. The cars sometimes are referred to as "16A/B," meaning it could be either a sail or batten car.

As shown in Figure 2A, present day methods and apparatus only accommodate vertical stacking of sail cars, as the track is aligned along a vertical centerline of a mast. This is not conducive to efficient storage of a very tall sail, such as one rising on a mast 250 or so feet above a boom 17 and having perhaps twelve batt cars and another forty sail cars thereon. Such tall sail would produce a vertical elevation of about 20 feet of stacked cars upon lowering of the sail. For that matter, boats with masts on the order of 75 to 80 feet could benefit from the present invention.

Accordingly, the method and apparatus of the present invention address the problem of stacking of the cars to a height approximately half, say 10 feet or less, of that previously obtained.

Turing now to Figure 2B it will be seen that a novel configuration for the track 18 is proposed which will drop the sail 14 in a novel configuration as shown. As better illustrated in Figure 3, 4 and 9-11, the track 18 is a singe track 18 along the greater upper length of the mast. However, along a lower portion of about 10 feet or so, the track 18 is split into port and starboard sections, 18a and 18b, respectively. As alternating cars 16A or B are guided to either track section 18A or 18B, it will be understood that the excessive height of vertically stacked cars 16A or B will be approximately halved. It should be understood that the track 18, 18A and 18B can be assembled, say, from convenient 6 foot lengths 18D to the desired lengths.

It will be seen that some of the methods and apparatus 20 for producing such alternate stacking are illustrated in Figures 3 and 4 and 9-11. In a first embodiment 20A, all track sections 18, 18A and 18B are stationary while in a second embodiment 20B, a small track section 18C adjacent and above the track sections 18A and 18B is movable, and in this instance, pivotable about pivot point 22.

Turning now to the first embodiment 20A wherein all track sections are fixed in position, it will first be understood that the mast 12 may be provided with a mounting flat 24 (Figure 8) along a circumferential or perimeter area 26 (Figure 8) thereof to which the base 24A (Figure 8) of apparatus 20 and/or track 18 is mounted.

From Figures 3 and 4 further, it will be seen that the bottom track sections 18A and 18B are formed in a "y" or wishbone configuration and have a switch means 21 where alternating cars 16 can follow along the same track section, such as 18A, while adjacent cars 16 (or 16A/B) can follow opposite track sections 18A, 18B, producing two stacks of

cars 16 which will approximately half the height of cars stacked vertically. To accomplish this alternative stacking, a switch means or section 21 is provided with port and starboard guide tracks 21A and 21B respectively, which engage respective port or starboard guide pins 40 (see Figures 12A, B and C) formed on or provided on the cars 16A/B. One way to achieve this is to use screw ended 40A guide pins means that can be screwed into either the two port or two starboard threaded holes 40P/40S provided in the inner and mast side of the track car. Other means could be provided and achieve such stacking. For example, magnets could be arranged on the track and cars to attract or repel, alternatively, if desired, the cars to the desired storage tank. Yet another means would be to use cam means for motioning the cars to appropriate track, be it ascending or descending the track sections, be it the upper section on the mast or the lower storage sections on the mast. Where guide pins are used, the upper edge of each of the port and starboard guide tracks 21A and 21B can be provided with entering ramp 40D (Figures 10 and 11) to "rerail" the descending guide pins onto upper end of the guide track. Thus, the two lower stacks of cars 16 produce a lower height, a more manageable stowage of the sail 14, decreasing the amount of sail 14 exposed to the elements such as wind. Also, covering of the sail is eased due to the decreased exposed area.

Also, as will be better described below when the sail cars 16 are defined, it will be understood that no user input is required to produce the desired stacking of the cars 16 when the sail is being lowered and no user input is required when raising the cars 16 to return them to a single file, centerline configuration, above the switch portion of the track.

In this embodiment, also, there are no moving parts required except for the cars 16 moving along the track 18, 18A or 18B, etc., and the guide pins moving in the guide tracks.

It will be understood that with either embodiment 20, the sail 14 when stowed, flakes or folds in a normal manner as shown in Figure 2B. The sail 14 is pulled to one side or the other of track 18 in Figure 2B by the car 16 leading the particular following section of sail 14 to its own side, i.e., toward track 18A or 18B, once past switch section 21, which is either fixed as in the first embodiment 20A or is pivotable as in the second embodiment 20B, to be defined further hereinbelow. The embodiments shown in Figures 3 to 9 are and operate similar to a "frog" of a railroad switch.

Referring to Figure 9, an enlargement of the section similar to that of Figure 3 is shown, and has optional wing guides 50 to help guide by inner car facing surface 52 with the sides of the cars 16 through the switch section 21 of apparatus 20 of the present invention. In other respects, this is similar to the structure shown in Figure 4. These wing guides 50, like track sections 18, 18A, 18B, etc., can be secured to the base 24A and/or mast 12, by a plurality of fasteners, such as screws or rivets, etc. 54.

Turning now to Figures 10 and 11, there is illustrated therein the second embodiment 20B wherein the switch section 21, in the form of a movable portion 18C of the track 18 is pivotable about a pivot point 22 to feed cars 16 to one or the other of bottom or lower track sections 18A and 18B, the switch section 18C having a neutral position as shown in Figure 11. To help maintain alignment, the lower end 18D of the

pivoting sections can slide under the cut-away lip 18E formed on the upper end of the lower sections.

Pivoting of the switch section 18c to one side or the other is accomplished through use of cars 16 which include a guide pin 40 thereon cooperating with port and starboard guide tracks, to be described below; with the guide pin 40 and guide tracks also functioning in a similar manner as in the first embodiment 20A.

While the guide pins and guide track will guide descending cars and move the pivot track, upon ascending a different means is used. For ascending a cam mechanism can be used (see Figure 19). That is, the pivoting track 18C at its lower end is fitted with a cam arm which is engaged by the ascending car's side to move the pivoting track section 18C in alignment to accept the ascending car.

While a pivoting track section is shown that pivots at the top, it would be within the scope of the present invention to provide a pivoting track section that pivots at the bottom thereof. Likewise, a movable track section could have a motion other than pivoting. For example, this movable track could slide so that first one section of storage track was aligned with one upper most section of track, then another section of storage track was aligned with the upper most section of the track, with the cars appropriately ascending or descending the upper track sections to or from the lower storage track sections during raising or furling the sail.

Not only can the sail be furled, it can also be reefed to expose less than its full sail area when sailing. During reefing, the desired number of cars (and sail) are stacked on the

storage tracks and then the sail is held down with reefing lines at the reef points in the sail. This same operation also holds the stored (reefed cars) tightly downward.

Perusing Figures 12A and 12B and 12C, the novel configuration of one car 16 used with both the embodiments 20A and 20B, it will be seen that the car has an opening 59 (Figure 12B) to receive one of tracks 18, 18A, 18B, etc. On car 16 the guide pin 40 is placed on a leading or forward edge 42 of each car 16 to one side of center. Here, two openings 40S and 40P, preferably threaded, are provided in each the leading and trailing edges 42 within one of which the pin 40 is secured, such as by screw threading as shown best in Figure 12B. It should be understood that when the sail is raised, the leading and trailing edges 42 are reverse from that when the sail is lowered.

Such pin or pins 40 when placed to the right (relative to Figure 12B) will engage a starboard groove or guide track 21B in the track section 18, and will be guided onto the starboard track section 18B, having a continuation of the starboard guide track or groove 21B therein.

Alternatively, when the pin or pins 40 is to the left (in Figure 12B) it engages in a port guide track or groove in track section 18 and is guided into a continuation of the port groove or guide track groove onto port track section 18A. Thus, it will be understood that pins 40 are placed toward opposite sides on adjacent cars 16 to produce right, left, right, left, or port, starboard, port, etc. stowage of the cars on the track sections 18B and 18A, respectively. Preferably, each car has two pins 40, one at or adjacent each of its leading and trailing edges 42.

Turning back to Figures 5 through 8, it will be understood that the cars 16 ride along the various track sections in guided position due to engagement of pins 40 within either guide track as provided on an anterior (outside) port or starboard, interior (mast side) face 60 of car 16. The removable pin 61 is provided to receive a sail or batten attachment.

Further, it will be understood from perusal of Figures 13A, 13B and 13C that various sail accessories can also be mounted on the cars 16. To this end, each car has the track opening 59 for receiving track 18, 18A, 18B, etc. As examples, a batten attachment 62 is illustrated as engaged to a car 16 in Figure 13A; a headboard 64 for a sail 14 is illustrated as engaged to a car 16 in Figure 13B, in this instance: a vertical double car and a bridge structure 66 is illustrated as engaged to double cars 16 in Figure 13C.

When this system is used with the storage tracks off of the centerline of the mast, there may be some sail nonsymmetry adjacent the boom due to one or two of the cars and adjacent sail luft of the sail being off centerline, but such is not sufficient to seriously effect sail performance and/or efficiency.

If symmetry is essential, such as in a high performance racing sailboat, some additional changes are made. To maintain sail symmetry, the bottom track cars that will be in the raised position but will be below the switch, say two or three cars 16, adjacent the boom 17 may be mounted along a centerline of the mast 12 rather than being fed onto side tracks 18A or 18B so that the sail 14 is symmetrical when filled with air when hoisted and on either a port or starboard track.

Various means can attain this goal, and the illustrative embodiments of Figures 14, 15, 16 and 17 are only to be considered as exemplary and not construed as limiting.

In Figure 14, it is proposed to provide a special car 80 which will ride down inner sides 81 and 82 of the tracks 18A and 18B, to be positioned therebetween so the cars 16 carry the sail 14 along the centerline of the mast 12. Alternatively, the car 80 could be constructed to fully engage both sails or tracks 18A and 18B, somewhat in the manner like shown in Figure 16, that is, have two openings 59 at the necessary spacing of tracks 18A and B.

Alternatively, in Figure 15, a center track 18D may be provided between tracks 18A and 18B onto which the lower cars 16 can be permanently mounted, with higher cars then being guided on the side tracks18A and 18B.

Further, in Figure 16, a horizontal bridge 90 can be provided between two parallel cars 16 on side tracks 18A and 18B, with the sail 14 engaging the center of the bridge 90, rather than the cars 16 to maintain a centerline position.

Yet another alternative shown in Figure 17 is to have one or the two lower tracks on the mast centerline, with the other storage track on either side to the port or starboard.

In Figure 18 is shown cam means for causing ascending cars to cause the upward motion of the car, to pivot the pivotal section of track into alignment to receive the reversing car. To this end, the cam means is in the form of a wing 56 extending from each side of the pivoting track section 18C that can be engaged by the reversing car on either storage track. Each of the wings has appropriate cutouts 58 to permit the car to pass from

the lower section 18A or 18B up onto the upper portion of the track on the mast as the sail is raised.

In Figure 19, a version of the present invention is shown which has three storage tracks 18A, 18B and 18E, with track 18E being on the centerline with the upper portion of the track 18. In this version, a pivoting section 18C can be moved or pivoted to engage or align with any of the track sections 18A, 18B and 18E. As shown, track 18A is to port and track 18B as to starboard of the center storage track 18E. This arrangement has the advantage of reducing the height to 1/3 of that without the invention, but yet keep the cars closest to the boom on the centerline of the mast. This arrangement would be useful in a large high performance sailboat.

While two and three storage track switch arrangements have been shown even four or more could be used.

The three track arrangement has the advantage of further reducing the stack height from over 20 feet for a single track, to 10 feet with a double track, to less than 7 feet with a triple track, to about five feet with quadruple track arrangement. While the invention has been described for a sailboat with a mast of about 250 feet tall, it is also useful with smaller boats, say where the mast height is 60 feet or greater and would reduce stacked height of the furled main or other sail. This invention would enable shorter persons to more easily reach the headboard and halyard of a lowered sail. While the invention has been disclosed in connection with a main sail, it could be used for other type sails.

As described above, the method and apparatus of the present invention provide a number of advantages, some of which have been described above and other of which are

inherent in the invention. Also modifications may be proposed to the teachings herein without departing from the scope of the invention.